Mouse Immunology: T-Cell-Prime

(Launch 4/5/10 STS-131) NNH07ZTT001N

PI: Millie Hughes-Fulford Ph.D
Co-I: Tammy Chang,M.D. Ph.D.
Northern California Institute for Research and Education (NCIRE)
University California San Francisco (UCSF),

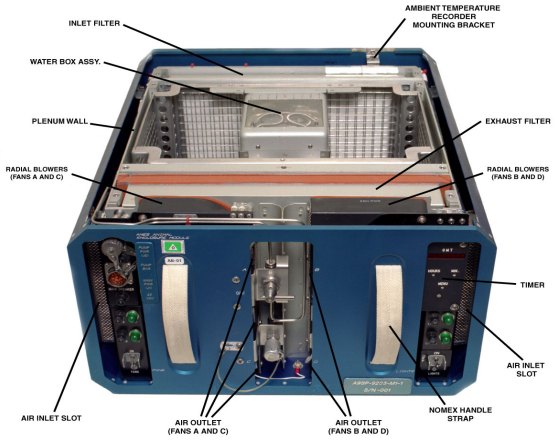
Summary: This innovative experiment will determine the effects of spaceflight on the rodent immune system: 1) whether initial specific activation of T-lymphocytes is intact and, 2) whether memory of prior exposure to a foreign antigen is retained by T-lymphocytes during spaceflight. Two Animal Enclosure Modules (AEMs) will accommodate eight female mice each for the flight experiment. The AEMs are series re-flown hardware and provide a reliable habitat for rodents during spaceflight.

Objectives:

1. To determine whether T-cell priming pre-flight, or the initiation of T-cell responses in vivo is inhibited by spaceflight. 2. Determine whether memory T-cells are maintained and function normally in spaceflight. Memory T-cells are previously activated, long-lived cells that generate robust secondary responses upon antigen re-challenge.

Accomplishments: Flight documentation including flight and ground requirements are completed. Completed the Experiment Verification Test and received IACUC protocol approval.. Completed crew training. Completed all hardware, animal , and science preparations for flight. Launch April 5, 2010, recovery April 2010. Animals recovered and returned to KSC lab in 2 hours post-flight. All animals were in good shape following flight and science operations are proceeding according to plan.

Significance: Determining whether the initiation of T-cell responses in vivo is inhibited in spaceflight is a fundamental and important question because it has direct implication for whether astronauts/cosmonauts may be able to mount protective immune responses to new infections during spaceflight. Determining whether memory T-cells are maintained and function normally during space flight will indicate whether pre-flight vaccinations may be effective and protective against infection risks in spaceflight.



AEM OVERVIEW AND AIR FLOW SYSTEM